

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference H0002800-PCT	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/US 01/ 45650	International filing date (<i>day/month/year</i>) 09/10/2001	(Earliest) Priority Date (<i>day/month/year</i>) 19/07/2001
Applicant HONEYWELL INTERNATIONAL INC		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 6 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☒ Unity of invention is lacking (see Box II).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

16

☒ as suggested by the applicant.

☐ None of the figures.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

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national application No.
PCT/US 01/45650

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-8, 35-43, 58-65

A method of forming a metallic article (preferably a PVD target) having a fine grain size, a fine grained PVD target and a magnetron plasma sputter reactor comprising the fine grained target.

2. Claims: 9-16

A method for casting an ingot.

3. Claims: 17-34, 44-57

A PVD target of a shape having rounded corners and a magnetron plasma sputter reactor comprising such a target.

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Int'l Application No

PC./US 01/45650

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C23C14/34 C22F1/00 C22F1/08 B22D7/00 B22D27/08
B21J5/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C23C C22F B22D B21J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01 29279 A (YAO LIJUN ;UEDA TADAO (JP); HONEYWELL INT INC (US)) 26 April 2001 (2001-04-26) page 6, line 32 -page 7, line 6; claims 1-7,14-16	1-8, 35-43, 58-65
X	US 6 045 634 A (ANNAVARAPU SURESH) 4 April 2000 (2000-04-04) claims 1-10	35-43, 58-65
A	US 5 087 297 A (POULIQUEN BENOIT) 11 February 1992 (1992-02-11) column 3, line 52 - line 66; claims 1,2	1
A	US 5 360 496 A (KUHLMAN G WILLIAM ET AL) 1 November 1994 (1994-11-01) column 5, line 39 -column 6, line 26	1,3
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☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

14 April 2003

Date of mailing of the international search report

15. 05. 2003

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INTERNATIONAL SEARCH REPORT

Int. 'onal Application No

PC 1/US 01/45650

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 26, 1 July 2002 (2002-07-01) & JP 2001 240949 A (MITSUBISHI MATERIALS CORP), 4 September 2001 (2001-09-04) abstract	1-8, 35-43, 58-65
A	--- US 4 463 797 A (BERG CHARLES A) 7 August 1984 (1984-08-07) column 1, line 34 - line 38; claim 1	9
A	--- US 3 786 855 A (SAITO K ET AL) 22 January 1974 (1974-01-22) claim 1	9
A	--- PILUSHENKO V L ET AL: "INFLUENCE OF MECHANICAL OSCILLATIONS ON STRUCTURE FORMATION OF FLATCASTINGS DURING METAL SOLIDIFICATION" STEEL IN TRANSLATION, THE INSTITUTE OF MATERIALS, LONDON, GB, vol. 23, no. 2, 1993, pages 31-33, XP000413852 ISSN: 0967-0912 figures 1,2	9
A	--- LEGER M-T ET AL: "AFFINEMENT DU GRAIN DE SOLIDIFICATION PAR VIBRATION MECANIQUE APPLICATION A L'ACIER INOXYDABLE AUSTENITIQUE" FONDERIE, FONDEUR D'AUJOURD'HUI, EDITIONS TECHNIQUES DES INDUSTRIES DE LA FONDERIE. PARIS, FR, no. 162, 1 February 1997 (1997-02-01), pages 20-24, 37-41, XP000690895 ISSN: 0249-3136 figure 6	9
X	--- E.P.DE GARMO: "Materials and Processes in Manufacturing, 6th Edition" 1984, MACMILLAN, NEW YORK XP002238210 * Die Design Factors - Point 4* page 351; figure 352 -----	17-34, 44-57

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Information on patent family members

International Application No

PCT/US 01/45650

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0129279	A	26-04-2001	JP 2001115257 A	24-04-2001
			JP 2001316803 A	16-11-2001
			AU 8022400 A	30-04-2001
			EP 1230418 A1	14-08-2002
			WO 0129279 A1	26-04-2001
			US 2002189728 A1	19-12-2002
			US 6423161 B1	23-07-2002
			US 2001015246 A1	23-08-2001
			US 2001015242 A1	23-08-2001
US 6045634	A	04-04-2000	JP 11229130 A	24-08-1999
US 5087297	A	11-02-1992	JP 4246170 A	02-09-1992
US 5360496	A	01-11-1994	US 5374323 A	20-12-1994
			DE 4412031 A1	13-10-1994
			FR 2703608 A1	14-10-1994
JP 2001240949	A	04-09-2001	NONE	
US 4463797	A	07-08-1984	US 4256919 A	17-03-1981
			US 4290475 A	22-09-1981
			US 4398474 A	16-08-1983
US 3786855	A	22-01-1974	BE 806523 A7	15-02-1974